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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,969	11/24/2003	Haim Kopylovitz	EMS-06901	5218
52427 7590 01/19/2007 MUIRHEAD AND SATURNELLI, LLC 200 FRIBERG PARKWAY, SUITE 1001 WESTBOROUGH, MA 01581			EXAMINER LOVEL, KIMBERLY M	
			ART UNIT 2167	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

**Advisory Action
Before the Filing of an Appeal Brief**

Application No.

10/720,969

Applicant(s)

KOPYLOVITZ, HAIM

Examiner

Kimberly Lovel

Art Unit

2167

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 26 December 2006 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
(a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
(b) ☐ They raise the issue of new matter (see NOTE below);
(c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
(d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☐ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.
The status of the claim(s) is (or will be) as follows:
Claim(s) allowed: _____.
Claim(s) objected to: _____.
Claim(s) rejected: _____.
Claim(s) withdrawn from consideration: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because:
See Continuation Sheet.
12. ☐ Note the attached Information Disclosure Statement(s). (PTO/SB/08) Paper No(s). _____.
13. ☐ Other: _____.


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SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

Continuation of 11. does NOT place the application in condition for allowance because:

- Referring to Applicant's remarks on page 10 regarding the Section 103 rejection of claim 1: Applicant argues that "Hitz does not show, teach or suggest the feature recited in Applicant's independent claim 1, where, in response to a write to a section of the stored data pointed to by a pointer of the table of the virtual storage area, data is copied from the storage data to a section of another storage area prior to the write and the pointer (of the virtual storage area) is caused to point to the other storage area. Hitz discloses that, when data is written to the file system, the data is copied to a new location (e.g., copied from the old block 1818 to the new block 1824 in Figure 18C) and the device to which the write occurred is made to point to the new data block 1824. Thus, unlike Applicants' claimed invention where the virtual device points to the moved old data, Hitz teaches the opposite where the original device to which the write is being made points to a different block that is allocated."

The examiner respectfully disagrees. On page 10 of the remarks, the applicant states "Hitz discloses that, when data is written to the file system, the data is copied to a new location (e.g., copied from the old block 1818 to the new block 1824 in Figure 18C) and the device to which the write occurred is made to point to the new data block 1824." In the broadest interpretation of the claim language, this statement is considered to read on the limitation "in response to a write to a section of the stored data pointed to by a pointer of the table of the virtual storage area, data is copied from the storage data to a section of another storage area prior to the write and the pointer is caused to point to the other storage area." It is noted that the claim fails to explicitly state "a virtual storage area."

- Referring to Applicant's remarks on page 14 regarding the Section 103 rejection of claim 1: Applicant argues that "It is respectfully submitted that modifying Hitz as taught by Siddha as suggested in the Office Action would change the principle of operation of Hitz. Hitz teaches that the system described therein operates because the WAFL system always writes new data to an unused disk location rather than to the currently used location. It is respectfully submitted that modifying Hitz according to Siddha as suggested in the Office Action to write new data to the currently used location and copying the old data to an unused disk location would contract the storage efficiencies that the Hitz system is meant to provide. As mentioned above, Hitz specifically states that because WAFL always writes new data to unused disk locations, the snapshot tree does not change even though the active file system does. Modifying Hitz according to Siddha as suggested by the examiner would make this no longer true and accordingly, the combination of Siddha with Hitz as suggested in the Office Action would change the principle of operation of Hitz."

The examiner respectfully disagrees.

The Hitz reference discloses a system for maintaining consistent states of a file system. As part of this system, snapshots of the file system are created. Hitz' snapshots are read-only copies of the file system that use no disk space when they are originally created, because unlike prior art file systems that create a snapshot (clone) by duplicating an entire inode file and all of the indirect blocks, Hitz duplicates only the inode that describes the inode file. (See Abstract).

Hitz describes the shortcomings of the prior art in column 3. Using prior art techniques, each time the system creates a snapshot of the file system, the duplication of the entire inode file and all indirect blocks can amount to as much as 32MB on a 1GB disk, which makes ensuring data integrity through the use of multiple snapshots maintained on the active file system prohibitively expensive in terms of disk space usage.

Hitz' snapshots, however, require the duplication of only the inode describing the inode file, which uses very little disk space. So long as no data on the disk is changed, there is no additional disk space required for the maintenance of the snapshot.

In order to maintain the current snapshot when data is changed, Hitz uses a copy-on-write technique. Drawing Figure 18A illustrates a file system with no snapshot. The creation of a snapshot results in Figure 18B. Note that when initially created, both inodes point to the same data blocks A-E, since the snapshot reflects the file system as it currently exists.

As is illustrated in drawing Figure 18C, when data on a block is about to be modified, the system creates a copy of the data block to be modified (D'), changes the pointer in the inode of the current file system 1810 to point to the new block D', and makes the change to the data in block D'. The current file system now includes data blocks A, B, C, D' and E, while the snapshot continues to point to the original data block D. In this way, only those data blocks which have actually been modified need be copied in order to maintain a snapshot. This is the innovation introduced by the file system of Hitz.

The Siddha reference teaches a system for creating snapshots substantially equivalent to that of Hitz, except that while Hitz redirects the pointer of the file system inode to the new block and maintains the snapshot pointer to the existing block, Siddha's copy-on-write scheme redirects the snapshot's pointer to the new block and maintains the file system's inode to the existing block. The difference can be most readily seen in the contrasting drawings; Hitz' Figure 18C and Siddha's Figure 1. (Note that in Figure 18C, the pointer from file system inode 1810 should actually be pointing to new data block 1824).

The applicant makes much of the fact that the Hitz reference discloses that "Because WAFL always writes new data to unused disk locations, the snapshot tree does not change even though the active file system changes." (see col. 18, lines 30-32).

This fact, however, has nothing to do with the feature of the Hitz invention that constitutes the improvement over the prior art, and is in fact the principle of operation of the system. The improvement and principle of operation has to do with the fact that each snapshot of the Hitz system requires only a single inode to be created, and thereafter requires the duplication of only those data blocks which have been modified.

This is in contrast to the prior art, where a second copy of the entire inode file as well as copies of all indirect blocks are required for the creation of a snapshot.

In their ruling in *In re Ratti*, 270 F.2d 810, 123USPQ 349 (CCPA 1959), the CCPA stated that "the suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate." 270 F.2d at 813, 123 USPQ at 352.

In the case of the proposed combination of references, the borrowing of the feature of Siddha's copy-on-write scheme (making the duplicated block part of the snapshot and maintaining the original block as part of the file system) into the system of Hitz (making the duplicated block part of the file system and maintaining the original block as part of the snapshot) would clearly not "require a substantial

reconstruction and redesign", nor would it change the principle of operation of the Hitz system. At best, Hitz' implementation of a copy-on-write scheme is merely an arbitrary design choice.

There is certainly no difference in performance gained by Hitz' copy-on-write scheme over that of Siddha. In both cases, the data block being modified must be duplicated, in both cases the pointer from one inode (either the file system inode or the snapshot inode) must be moved from the existing block to the new block, and in both cases the desired change must then be implemented in the data block which remains part of the current file system. The performance is exactly the same for both copy-on-write schemes. There is no advantage to be gained by implementing either of the disclosed copy-on-write schemes over the other.